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<p>(21) International Application Number: PCT/SE94/00776</p> <p>(22) International Filing Date: 25 August 1994 (25.08.94)</p> <p>(30) Priority Data: 9302784-5 26 August 1993 (26.08.93) SE</p> <p>(71) Applicant (for all designated States except US): SCANDMEC AB [SE/SE]; P.O. Box 54, S-505 28 Mullsjö (SE).</p> <p>(72) Inventor; and</p> <p>(75) Inventor/Applicant (for US only): WIDEN, Torgny [SE/SE]; Pl. 1045, S-672 00 Årjäng (SE).</p> <p>(74) Agents: GRAUDUMS, Valdis et al.; Albihn West AB, P.O. Box 142, S-401 22 Göteborg (SE).</p>		<p>(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LT, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD).</p> <p><b>Published</b> With international search report. In English translation (filed in Swedish).</p>	

A method for production of a vehicle seat with a heating element, wherein the seat essentially comprises an upholstery layer (9, 14) and a core (13) which is formed from a foam material through filling a mould (12) with the upholstery layer arranged in the mould. The upholstery layer (9, 14) and the heating element (1), which consists of a heating loop (2), are inserted. The heating loop (2) is located in a particular position by means of a carrier (7) through heat pressing of the heating element against the upholstery layer so that the carrier of the heating element fuses together with the upholstery layer for locating the heating loops in relation to the upholstery layer. Thereafter, the foam material is filled in the mould for forming the core (13). The invention also relates to a heating element for use in the above-mentioned method.

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HEATING ELEMENT FOR A VEHICLE SEAT

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## TECHNICAL FIELD:

The present invention relates to a method for production of a heating element, in accordance with the preamble of appended claim 1.

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The present invention also relates to a heating element intended for production in accordance with the above-mentioned method, in accordance with the preamble of appended claim 4.

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## BACKGROUND OF THE INVENTION:

Production of heating elements for vehicle seats are previously known, which seats comprise an electrically conducting heating loop which is inserted between at least two material layers. Conventional heating elements are produced as separate products which are suitable for a demanding handling, for example post-assembly in existing vehicle seats. The surrounding material layers have served as protection and carrier layers and have been of such a thickness that the heating elements may have been noticed by the user, due to stiffness as well as level differences in the seat around the edges of the element. Furthermore, the increasing pursuit of cost reductions in connection with vehicle components has increased the requirements for low production costs as regards both material and assembly costs.

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The object of the present invention is to provide a method and a heating element for vehicle seats which solve the above-mentioned problem so that vehicle seats may be provided with heating elements at an additional cost which is very limited and with an increased ride comfort.

#### SUMMARY OF THE INVENTION:

Said object is achieved by means of a method and a heating element whose features will become apparent from appended claims 1 and 4, respectively.

#### BRIEF DESCRIPTION OF THE DRAWINGS:

The invention will be described in the following in connection with an embodiment and with reference to the annexed drawings, in which

- Fig. 1 is an exploded view which shows schematically the construction of an example of a heating element for use in connection with the method according to the invention,
- Fig. 2 is a cross-section of a vehicle seat with a heating element during the production process, and
- Fig. 3 is an exploded view which illustrates schematically the method for production of a vehicle seat according to the invention.

#### PREFERRED EMBODIMENT:

The basic idea according to the present invention is to provide a heating element with as simple a design as possible, and to limit the steps of handling of the element and the handling time before mounting thereof in a vehicle seat. In this manner, lower requirements may be made on the mechanical design of the element as regards the handling before the assembly stage, which thereby reduces the additional costs required for providing a vehicle seat with

a heating element. Nevertheless, in order to obtain reasonable handling properties, the heating element is preferably provided with layers which are removed either before the mounting of the heating element during the production process or alternatively during a certain stage in the process.

The design of the heating element 1 before the production of the vehicle seat is best apparent from Figs. 1 and 3. According to the shown example, the heating element consists of an active component in the form of one or several heating loops 2 which consist of an electrically conducting resistance wire. In a conventional manner, this wire is produced from a metal or a metal alloy with a suitable resistance in order to generate heat when a voltage is applied over the terminals 4, 5 of the wire. The wire may be non-insulated or insulated by means of conventional insulation materials. In the shown example, the wire is surrounded by three protection and/or carrier layers 6, 7, 8.

The upper carrier layer 6 is produced for example from a polyethene foil which is relatively tough and durable and which is intended to simplify the handling of the heating element before the assembly stage and during a first step thereof, which will be described in greater detail below.

A carrier layer 7 of a material which can be fused together with a layer 9 in the upholstery material 10 of the vehicle seat is arranged between the upper carrier layer 6 and the heating loop 2, which will be described in greater detail below. This carrier layer 7 is for example produced from a polyurethane foil and thus possesses, besides its function as a carrier for locating the wire according to a predetermined loop shape, also the function of locating the heating loop in a particular position in the vehicle seat.

The locating of the carrier layer 7 and the heating loop is attained for example by means of glue spots or glue lines 11 which are shown schematically in Fig. 3.

5 In order to protect the heating wire during handling before the insertion and assembly of the heating element, a third protective layer or carrier layer 8 is attached by means of for example a glue composition against the heating loop. For example, this protective layer 8 is made of a so called  
10 release paper, which is thus to be removed before the element is arranged next to the upholstery layer, either before the production process or as a first step in the production process. The two upper carrier layers 6, 7 are attached together by means of the relatively favourable  
15 adhesive properties of the materials or by means of a not shown adhesive.

The production of a vehicle seat with the heating element according to the present invention will now be described,  
20 in particular with reference to Figs. 2 and 3. As has been initially described, the method and the heating element according to the invention relates to the type of vehicle seat production where the filling or the core forming the elastic comfort-providing carrier for the upholstery  
25 material is not formed until the upholstery has been arranged on the finished core, but instead is formed by means of filling expanding cold foam, for example polyurethane foam, into a mould of expanding cold foam in order to produce the comfort-supplying elastic core 13.

30 The upholstery material 10 is first put into the mould 12 with its outer side, made for example from a layer 14 of fabric, turned towards the wall 15 of the mould. As has been mentioned above, besides from the fabric material 14,  
35 the upholstery material 10 also consists of an internal layer 9 of for example a polyurethane foil which is firmly

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attached directly to the layer of fabric or to an intermediate foam material. The upholstery material 10 is produced and finished in a previous step, for example by means of flame lamination or glueing. In a previous step, performed for example at a manufacturer of upholstery materials, the heating element 1 according to the invention may be attached to the inside of the upholstery material, i.e. to its polyurethane film 9, or may alternatively be arranged in a separate step in the mould 12 against the upholstery material.

Prior to inserting the heating element, the lower carrier layer or protective layer 8, i.e. the so called release paper, is removed, after which the heating element is arranged in a predetermined position against the inside of the upholstery material 10. Thereafter, the heating element is heat pressed at a temperature of for example 175-180° C so that the fusible carrier layer 7 fuses together with the inner layer 9 of the upholstery material. In the shown example both of these layers are made from the same material, i.e. polyurethane foil. In this manner, the heating loop is fixed against the upholstery material 10.

In those cases where the heating element is provided with an upper carrier layer 6, the latter is removed in a subsequent step. The upper carrier layer 6 is thus manufactured from a material which does not fuse together during said heat pressing operation. In this regard, the location of the heating element is completely fixed against the upholstery material, after which the core 13 is produced by filling the cold foam 13, after which the foam expands during a fermentation process and completely fills the inner parts of the mould and is attached to the inner layer 9 of the upholstery material, which in the shown example is also made from the same material as the foam material, i.e. polyurethane. The layer 9 also prevents the

expanding foam from entering and penetrating the upholstery material.

5 The present vehicle seat, or more precisely a part thereof,  
is thus essentially finished after clean cutting and  
applying a possible rear side. Although it is not shown in  
the drawing, it is ensured that the heating element already  
in connection with its insertion is provided with a supply  
10 wire which extends from the upholstery material and the  
core for connection to a not shown control unit for  
controlling the power supplied from the voltage source of  
the vehicle.

15 The invention is not limited to the above-described  
embodiments which are also shown in the drawings, but may  
be varied freely within the scope of the appended claims.  
For example, the heating element may in principle consist  
of a single carrier layer, i.e. the carrier layer 7.  
Furthermore, this layer may be provided with a structure  
20 which is adapted to each application, for example a porous  
structure or a structure provided with holes or grids, in  
order to provide air-permeability and thereby also improved  
comfort. Also, the carrier layer may in principle be  
entirely sealed. It is obvious that the layers of the  
25 heating element and the heating loop are closely connected  
to each other. Also, for clarity the different components  
are shown interspaced in Fig. 2, whereas in reality these  
are closely arranged against one another.



## 5 CLAIMS:

1. Method for production of a vehicle seat with a heating  
element, wherein the seat essentially comprises an  
upholstery layer (9, 14) and a core (13) which is formed of  
10 a foam material by filling a mould (12) with said  
upholstery layer arranged in the mold,  
c h a r a c t e r i z e d b y the following steps:  
arranging said upholstery layer (9, 14) and said heating  
element (1), which consists of one or several heating loops  
15 (2), located by means of a carrier (7) through heat  
pressing of the heating element against said upholstery  
layer so that the carrier of the heating element fuses  
together with said upholstery layer for locating of said  
heating loops in relation to said upholstery layer, filling  
20 said foam material in the mould for forming the core (13).

2. Method according to claim 1, c h a r a c t e -  
r i z e d i n that the heating element (1) is provided  
with at least one additional carrier layer (6) for the  
25 handling of the element and that said additional carrier  
layer is removed after the heating element has been  
inserted.

3. Method according to claim 2, c h a r a c t e r i z e d  
30 i n that the heating element's (1) additional carrier  
layers (6, 8) are two in number and that one of them is  
removed prior to inserting the heating element, and that  
the other carrier layer (16) is removed after said fusing  
of the fusible carrier layer (7) together with said  
35 upholstery layer.

4. Heating element (1) for use in a method for the production of a vehicle seat, wherein the seat essentially comprises upholstery layers (9, 14) and a core (13) which is formed from a foam material by means of filling a mould (12) with said upholstery layers arranged in the mould, which heating element comprises at least one heating loop (2), c h a r a c t e r i z e d i n that the heating loop is connected to at least one carrier (7) in the form of a layer made from a material which may be fused together with the upholstery layers (9, 14) of the vehicle seat.

5. Heating element (1) according to claim 4, c h a r a c - t e r i z e d i n that said carrier (7) is provided with a grid structure or the like which may be fused together with the upholstery layer (9, 14).

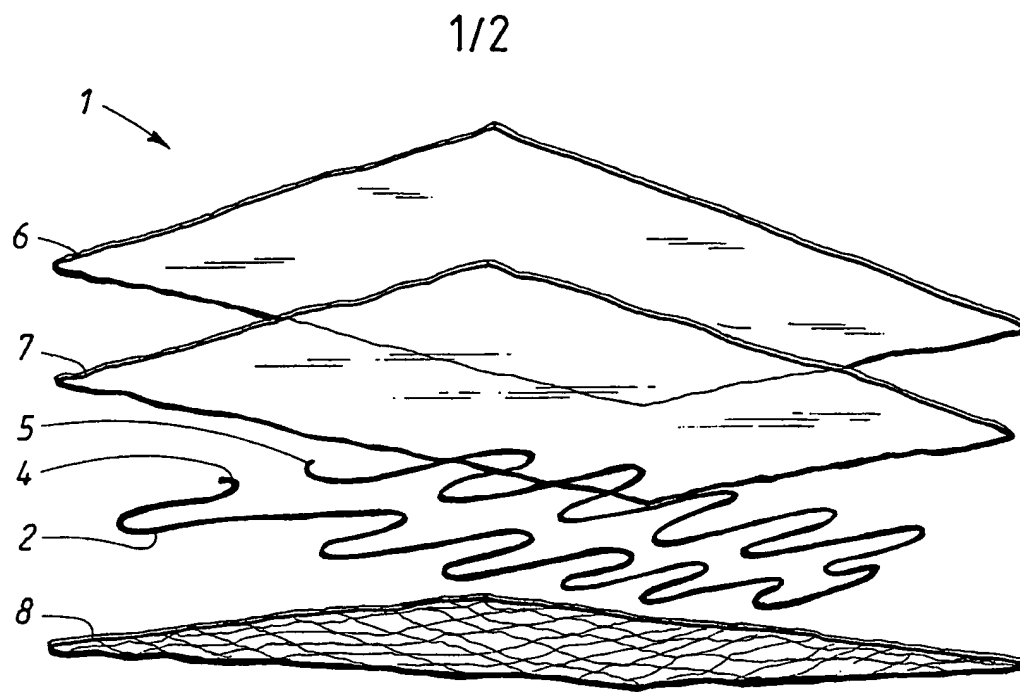


FIG. 1

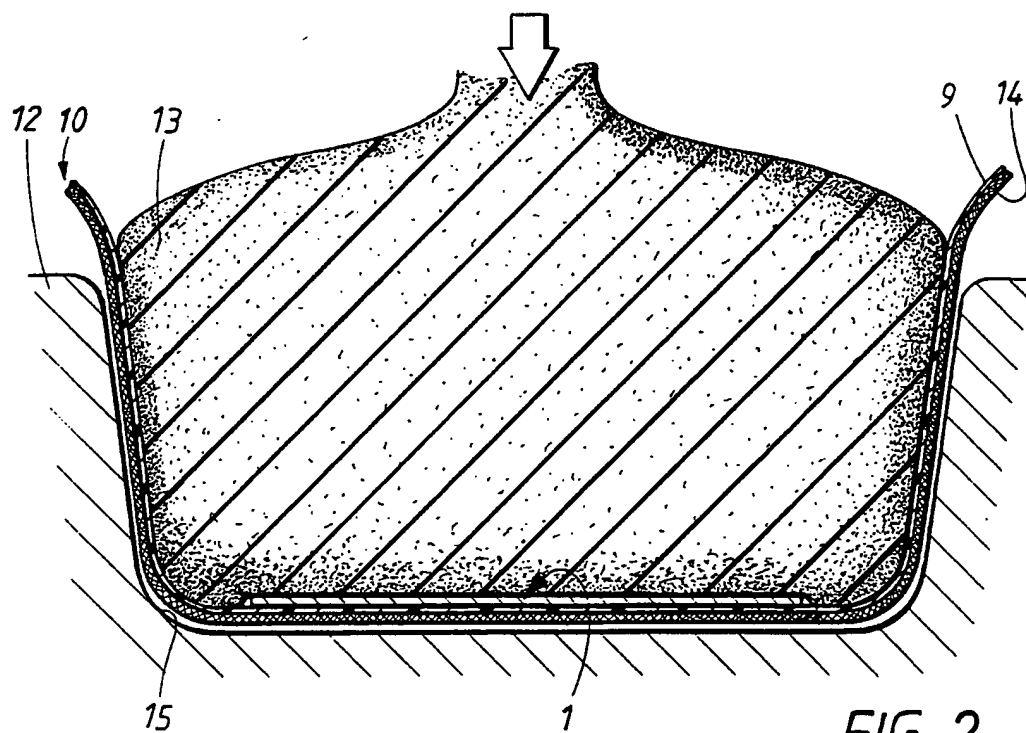
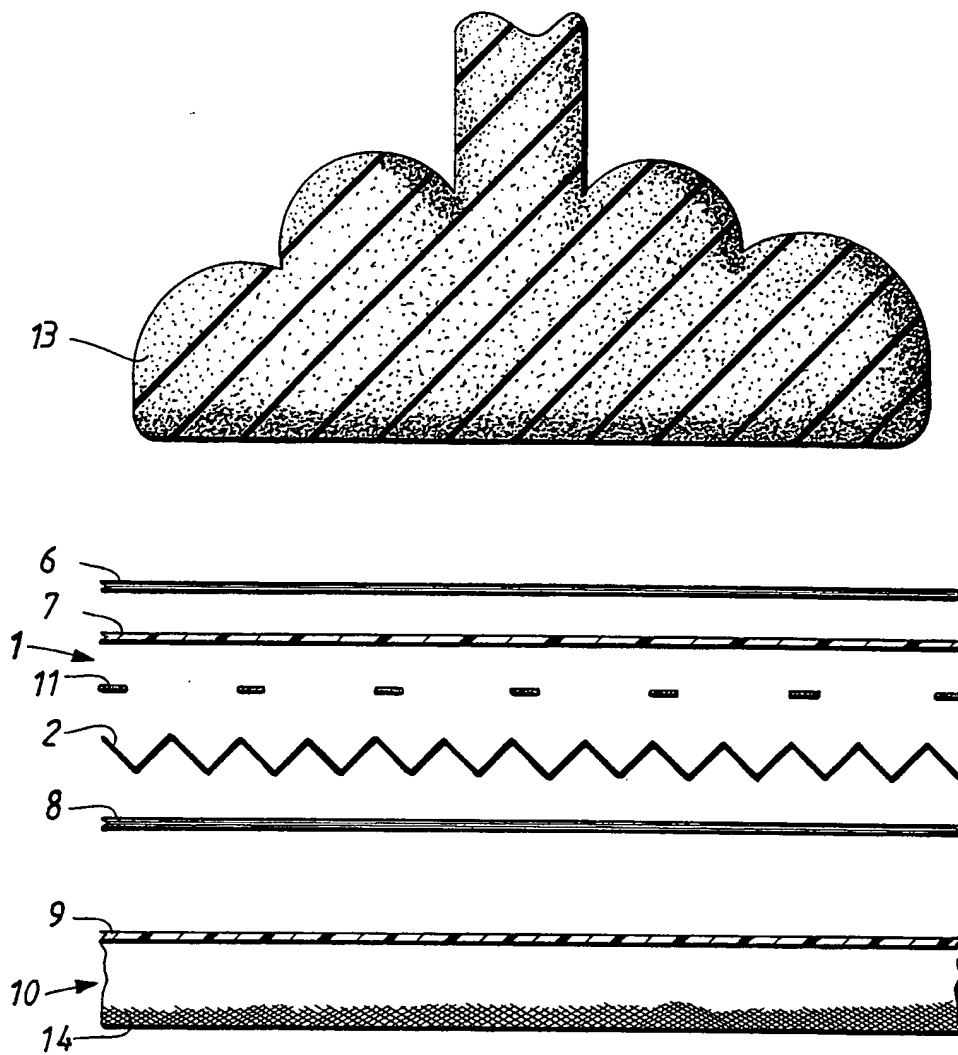


FIG. 2

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FIG. 3

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 94/00776

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A47C 7/72

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A47C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO, A1, 9116841 (I.G. BAUERHIN GMBH ELEKTROTECHNISCHE FABRIK), 14 November 1991 (14.11.91)  --	1-5
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**INTERNATIONAL SEARCH REPORT**  
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Patent document cited in search report		Publication date	Patent family member(s)		Publication date
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			EP-A-	0491011	24/06/92
US-A-	4869550	26/09/89	CA-A-	1276963	27/11/90
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